

## Single dominant left coronary artery: An autopsy case report with review of literature

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### ABSTRACT

Coronary artery anomalous course is rare, reported incidence is approximately 0.3–1.3% of patients undergoing coronary angiography and approximately 1% of routine autopsy examinations. A single coronary artery is an unusual congenital anomaly where only one coronary artery arises from the aortic trunk from a single coronary ostium, supplying the entire heart. We describe here a rare case with an unusual dominant left circumflex artery and absent right coronary artery.

**Key words:** Coronary artery, heart, single coronary artery

### INTRODUCTION

Demonstration of coronary artery pathology in autopsies is vital for the elucidation of sudden death cases related to these lesions and for the development of new treatment approaches. Congenital coronary artery anomalies are frequently observed in athletes, representing the second most common cause for athletic field deaths (in about 20% of cases).<sup>[1]</sup> The incidence of sudden cardiac death was reported to be 57% among 49 cases of anomalous left coronary artery.<sup>[2]</sup>

### CASE REPORT

Autopsy was conducted on a thirty-year male who died in a road traffic accident and brought dead to the hospital. Heart dissection showed the absence of right coronary artery and the presence of left main trunk with unusual

dominant course of the left circumflex coronary artery which was supplying whole of the right heart. However, the left anterior descending artery was normal [Figure 1]. Cut section of the left circumflex coronary showed focal elevated areas [Figure 2] which microscopically showed [Figure 3] the features of pathological intimal thickening.<sup>[3]</sup> The family members informed that he did not had any medical/cardiac signs and symptoms, and was absolutely normal before death. There was no family history of any congenital or other cardiac disease.

### DISCUSSION

Coronary artery anomalies that entail a risk of sudden death are often associated with complex cardiac malformations but may occasionally be solitary.<sup>[4]</sup> The presence of a single coronary artery is an uncommon finding. Single coronary artery anomaly is most relevant clinically and associated with sudden cardiac death in young athletes and military personnel.<sup>[1]</sup>

A single coronary artery is an unusual congenital anomaly where only one coronary artery arises from the aortic trunk by a single coronary ostium and supply the entire heart. If a single common ostium is present, the pattern is considered to represent "single" coronary artery.<sup>[5]</sup>

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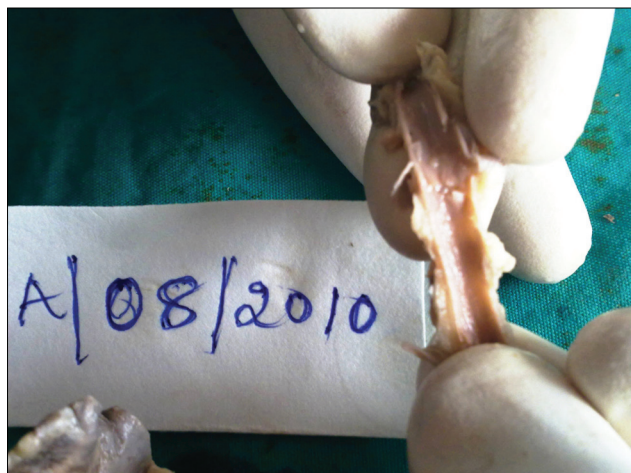
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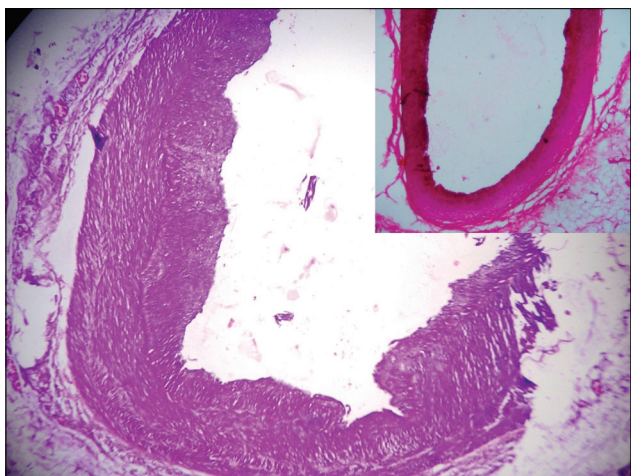
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**Figure 1:** Gross photograph of dissected heart showing only the left coronary artery with anterior descending and left circumflex branches



**Figure 2:** Gross photograph of dissected left circumflex coronary artery showing focal elevated areas in tunica intima



**Figure 3:** Microphotograph of the left coronary artery showing intimal thickening. Inset shows normal intimal thickening (H and E,  $\times 100$ )

The incidence of single coronary artery in the general population is approximately 0.024–0.066%.<sup>[6,7]</sup> The separate origin (“absent left main”) of the left anterior

descending artery / left circumflex artery (30.4%) and the anomalous origin of the left circumflex artery (27.7%) are the two most common coronary anomalies.<sup>[8]</sup> The anomalous origin of the right coronary artery is also relatively common.<sup>[8]</sup>

The anomaly observed in this case was the absent right coronary artery and an unusual dominant course of the left circumflex artery running along the posterior surface of the heart and supplying whole of the right heart, which is an extremely rare occurrence. To the best of our knowledge such an anomaly has only been reported twice in the English literature.

The clinical outcome in patients with an anomalous coronary artery is heterogeneous with manifestations such as angina, syncope, myocardial infarction and sudden cardiac death.<sup>[2]</sup> These are most common causes for sudden and unexpected death in young individuals, particularly during sporting activities and the greatest incidence of sudden death occurs during heavy physical exertion.<sup>[1]</sup> The cause of sudden death varies from 25% for anomalous right coronary artery to 57% for anomalous left coronary artery.<sup>[2]</sup>

The mechanisms leading to sudden death are triggered by myocardial ischemia. Ischemia is the consequence of anatomical malformations, including the acute angle takeoff of the anomalous vessel, with a narrowed slit-like orifice that collapses in a valve like manner, thereby limiting the blood flow.<sup>[1]</sup>

Younger patients ( $\leq 30$  years old) are reported to die suddenly or during exercise than older patients, despite their low frequency of significant atherosclerotic coronary artery disease.<sup>[4]</sup> Garg *et al.* stated that atherosclerotic plaques in anomalous arteries were seen in 33% of the patients.<sup>[4]</sup> It was proposed that ischemia may be caused by sporadic spasm of the anomalous coronary artery induced by endothelial injury.<sup>[1]</sup>

Hence one should be aware of the incidence of single coronary artery in particular, the rarest single dominant left coronary artery especially in athletes and military personnel, who can be screened and proper measures can be taken.

## CONCLUSIONS

In conclusion, we present a case with the absent right coronary artery and the presence of left main trunk with an unusual dominant course of the left circumflex coronary

artery which was supplying whole of the right heart with normal left anterior descending artery. To the best of our knowledge such an anomaly has only been described twice in the English literature. Performing autopsies for a better understanding of the coronary artery anomalies associated with sudden death is important for the medicolegal resolution of the cases.<sup>[4]</sup>

## REFERENCES

1. Pelliccia A. Congenital coronary artery anomalies in young patients: New perspectives for timely identification. *J Am Coll Cardiol* 2001;37:598-600.
2. Rajashekar D, Ghosh P, Chandra A, Raju N. Anomalous origin and course of left anterior descending coronary artery. *Asian Cardiovasc Thorac Ann* 1999;7:244-6.
3. Virmani R, Kolodgie FD, Burke AP, Farp A, Schwartz SM. Lessons from sudden coronary death: A comprehensive morphological classification scheme for atherosclerotic lesions. *Arterioscler Thromb Vasc Biol* 2000;20:1262-75.
4. Türkmen N, Eren B, Fedakar R, Senel B. Sudden death due to single coronary artery. *Singapore Med J* 2007;48:573-5.
5. Angelini P, Velasco JA, Flamm S. Coronary anomalies: Incidence, Pathophysiology and Clinical relevance. *Circulation* 2002;105:2449-54.
6. Amasyali B, Kursaklioglu H, Kose S, Iyisoy A, Kilic A, Isik E. Single Coronary Artery With Anomalous Origin of the Right Coronary Artery From the Left Anterior Descending Artery With a Unique Proximal Course. *Jpn Heart J* 2004;45:521-5.
7. Tanawuttiwat T, Harindhanavudhi T, Trivedi D. Anomalous Single Coronary Artery with Absent Right Coronary Artery Diagnosed with the Aid of 64- Slice Multidetector Computed Tomographic Angiography. *Tex Heart Inst J* 2009;36:362-3.
8. Kang WC, Han SH, Ahn HT, Shin EK. Unusual dominant course of left circumflex coronary artery with absent right coronary artery. *Heart* 2006;92:657.

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